

# 2003 United States Outbreak of Monkeypox

In 2003, the U.S. experienced an outbreak of monkeypox. This was the first time human monkeypox was reported outside of Africa.

## How was monkeypox first diagnosed in the United States?

The clinical features of the illness in U.S. patients—fever, headache, muscle aches, and rash— were consistent with those of monkeypox. Initially, scientists at the Marshfield Clinic in Marshfield, Wisconsin, recovered a virus resembling a poxvirus from one of the first patients and the patient’s pet prairie dog. Laboratory tests at CDC—including several PCR-based assays looking for poxvirus DNA, electron microscopy, and gene sequencing—confirmed that the agent causing the illnesses was *monkeypox virus*.

## Which states were affected by the outbreak?

Forty-seven confirmed and probable cases of monkeypox were reported from six states—Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin – during the 2003 U.S. outbreak.

U.S. Monkeypox Cases by State, 2003

State	Confirmed Cases	Probable Cases
Illinois	9	1
Indiana	7	3
Kansas	1	0
Missouri	2	0
Wisconsin	18	6
<b>Total</b>	<b>37</b>	<b>10</b>

## How was monkeypox virus introduced into the U.S.?

Investigators determined that a shipment of animals from Ghana, imported to Texas on April 9, 2003, introduced monkeypox virus from the West African genetic group (clade) into the United States. The shipment contained approximately 800 small mammals representing nine different species, including six genera of African rodents. These rodents included rope squirrels (*Funisciurus sp.*), tree squirrels (*Heliosciurus sp.*), African giant pouched rats (*Cricetomys sp.*), brush-tailed porcupines (*Atherurus sp.*), dormice (*Graphiurus sp.*), and striped mice (*Lemniscomys sp.*). CDC laboratory testing using PCR and virus isolation demonstrated that two African giant pouched rats, nine dormice, and three rope squirrels were infected with monkeypox virus. After importation into the United States some of the infected animals were housed in close proximity to prairie dogs at the facilities of an Illinois animal vendor. These prairie dogs were sold as pets prior to their developing signs of infection.

## How was monkeypox virus transmitted to humans?

All people infected with monkeypox became ill after having contact with infected prairie dogs purchased as pets. A study conducted after the outbreak suggested that certain activities associated with animals were more likely to lead to monkeypox. These included touching a sick animal or receiving a bite or scratch that broke the skin. Another important factor was cleaning the cage or touching the bedding of a sick animal. No instances of monkeypox were attributed exclusively to person-to-person contact.

## What signs and symptoms were seen in pets?

During the U.S. outbreak, illness in animals included fever, cough, discharge from the eyes, and enlarged lymph nodes, accompanied by the development of lesions. Animals that had monkeypox also appeared to be very tired and were not eating or drinking. Some animals had only minimal signs of illness and recovered, while others died.

## Vaccine distribution during the 2003 U.S. outbreak

During the 2003 U.S. monkeypox outbreak CDC, along with the Advisory Committee for Immunization Practices (ACIP) advised the following people to get the smallpox vaccine:

- People who investigated animal or human monkeypox cases (e.g., public health and animal control workers).
- Any healthcare worker who was in close contact with a monkeypox patient. (Vaccination was considered up to 14 days after exposure to a monkeypox case.)
- Anyone who had close contact with someone who was infected with. (Vaccination was considered up to 14 days after exposure to a monkeypox case.)
- Anyone (including veterinarians and veterinary technicians) who had direct physical contact within 4 days of exposure with a confirmed infected animal. (Vaccination was considered up to 14 days after exposure.)
- Lab workers who handled specimens that could have contained monkeypox virus.

## How was the outbreak contained?

CDC and the public health departments in the affected states, together with the U.S. Department of Agriculture, the Food and Drug Administration, and other agencies, participated in a variety of activities that prevented further spread of monkeypox. To assist with the investigation and outbreak response, CDC took the following steps:

- Activated its Emergency Operations Center.
- Deployed teams of medical officers, epidemiologists, and other experts to several states to assist with the investigation.
- Conducted extensive laboratory testing on specimens from humans and animals thought to have been exposed to monkeypox.
- Issued interim U.S. case definitions for human monkeypox and for animal monkeypox.
- Issued interim guidelines on infection control and exposure management for patients in the health care and community settings.
- Issued an immediate embargo and prohibition on the importation, interstate transportation, sale, and release into the environment of certain rodents and prairie dogs.
- Provided ongoing assistance to state and local health departments in investigating possible cases of monkeypox in both humans and animals the United States.
- Worked with state and federal agencies to trace the origin and distribution of potentially infected animals.
- Issued an interim guidance on the use of smallpox vaccine, cidofovir, and vaccinia immune globulin in the setting of an outbreak of monkeypox.
- Issued interim guidelines for veterinarians.
- Issued interim guidance for persons who have frequent contact with animals, including pet owners, pet shop employees, animal handlers, and animal control officers.